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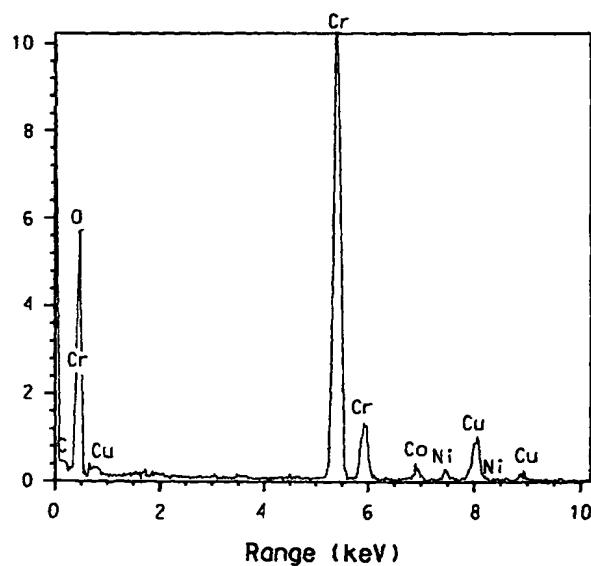
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(54) Title: NICKEL-SUBSTITUTED AND MIXED NICKEL-AND-COBALT-SUBSTITUTED CHROMIUM OXIDE COMPOSITIONS, THEIR PREPARATION, AND THEIR USE AS CATALYSTS AND CATALYST PRECURSORS



(57) Abstract: A crystalline alpha-chromium oxide where from about 0.05 atom % to about 2 atom % of the chromium atoms in the alpha-chromium oxide lattice are substituted by nickel atoms, and optionally, additional chromium atoms in the alpha-chromium oxide lattice are substituted by trivalent cobalt atoms (provided that the total amount of the nickel atoms and the trivalent cobalt atoms in the alpha-chromium oxide lattice is no more than 6 atom %) is disclosed. Also disclosed is a chromium-containing catalyst composition comprising as a chromium-containing component the crystalline substituted alpha-chromium oxide; and a method for preparing a composition comprising the crystalline substituted alpha-chromium oxide. The method comprises (a) co-precipitating a solid by adding ammonium hydroxide to an aqueous solution of a soluble divalent nickel salt, a soluble trivalent chromium salt, and optionally, a soluble divalent or trivalent cobalt salt, that contains at least three moles of nitrate per mole of chromium in the solution, has a nickel concentration of from about 0.05 mole % to about 2 mole % of the total of nickel, chromium, and cobalt in the solution, and has a combined concentration of nickel and cobalt of no more than 6 mole % of the total of nickel, chromium, and cobalt in the solution; and after at

least three moles of ammonium per mole of chromium has been added to the solution; (b) collecting the co-precipitated solid formed in (a); (c) drying the collected solid; and (d) calcining the dried solid. Also disclosed is a chromium-containing catalyst composition comprising a chromium-containing component prepared by treating said crystalline substituted alpha-chromium oxide with a fluorinating agent; and a process for changing the fluorine distribution (i.e., content and/or arrangement) in a hydrocarbon or halogenated hydrocarbon in the presence of a catalyst. The process involves using as the catalyst a composition comprising the crystalline substituted alpha-chromium oxide and/or the treated substituted alpha-chromium oxide.

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